Bundesstelle für Seeunfalluntersuchung
Federal Bureau of Maritime Casualty Investigation
Federal Higher Authority subordinated to the Ministry of Transport,
Building and Urban Development

Summary
Investigation Report 282/09

Very Serious Marine Casualty

Fatal accident while climbing from the pilot ladder of the MV YM TIANJIN onto a tender on 21 July 2009 in the roads of Kaohsiung, Taiwan

1 August 2010

www.bsu-bund.de

The investigation was conducted in conformity with the law to improve safety of shipping by investigating marine casualties and other incidents (Maritime Safety Investigation Law - SUG) of 16 June 2002.

According to said act, the sole objective of this investigation is to prevent future accidents and malfunctions. This investigation does not serve to ascertain fault, liability or claims.

This report should not be used in court proceedings or proceedings of the Maritime Board. Reference is made to art. 19 para. 4 SUG.

The German text shall prevail in the interpretation of this Investigation Report.

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1 Summary of the marine casualty

At about 0530[1] on 21 July 2009, a fatal accident occurred in the roads of Kaohsiung, Taiwan on board the YM TIANJIN, a container vessel flying the German flag. The German master, whose rotation had ended, and a German ship mechanic were to be taken ashore on a tender to start their home leave. The master boarded the tender via the combined accomodation/pilot ladder[2] without any problems. However, the ship mechanic, who was following, fell into the water while stepping from the pilot ladder onto the tender's boarding platform. The ship mechanic failed to reach the lifebuoys which were thrown in his direction. He submerged very quickly after a few swimming strokes and did not reappear for quite some time. The crew of the tender were assisted in their attempts to prevent the seaman, who was showing no signs of life, from drowning by the German master. The vessel had fenders (car tyres) attached and it was initially not possible to pull the lifeless body over her side; therefore, efforts were limited to holding the head of the injured person above water. It was only possible to recover the seaman at about 0620 after help was received from the crew of a coastguard patrol boat from which assistance had been requested. The casualty was immediately taken ashore in the tender and transported to a hospital. However, it is very probable that he had already succumbed to his injuries before being recovered from the water.

[1] All times shown in this report are local = UTC + 8 hours.
[2] Combined accomodation/pilot ladder = extended gangway followed by a conventional pilot ladder for the last few metres before the tender.

2 SHIP PARTICULARS

2.1 Photo

Figure 1: Photo[3]

2.2 Ship particulars

Name of vessel:	YM TIANJIN
Type of vessel:	Container vessel
Nationality/flag:	Germany
Port of registry:	Hamburg
IMO number:	9326744
Call sign:	DDDI2
Owner:	NSB Niederelbe Schiffahrtsgesellschaft mbH & Co. KG
Year built (keel laying/completion):	2005/2006
Shipyard/yard number:	Hyundai Heavy Ind. Co., Ltd., Ulsan / H 1742
Classification society:	Germanischer Lloyd
Length overall:	264.09 m
Breadth overall:	32.20 m
Gross tonnage:	41,899
Deadweight:	53,627 t
Draught (max.):	12.75 m
Engine rating:	36,560 kW
Main engine (type/manufacturer):	Diesel 8 K 90 MC-C Mk6 Hyundai MAN
(Service) speed (max.):	23.9 kts
Hull material:	Steel
Minimum safe manning:	18

[3] Source: www.reederei-nsb.com, used with kind permission of the vessel operator.

2.3 Voyage particulars

Port of departure:	-
Port of call:	-
Type of voyage:	Laid up in the roads of Kaohsiung, Taiwan
Cargo information:	-
Draught at time of accident:	-
Manning:	18
Pilot on board:	No
Number of passengers:	None

2.4 Marine casualty information

Type of accident:	Very serious marine casualty, personal accident
Date/Time:	21/07/2009 / 0530
Location:	Roads of Kaohsiung, Taiwan
Latitude/Longitude:	φ 22°25.7'N λ 120°18.8'E
Ship operation and voyage segment:	Lying at anchor
Consequences:	Death of a crew member

Excerpt from Nautical Chart 2702 (great circle chart of the Indian Ocean), BSH[4]

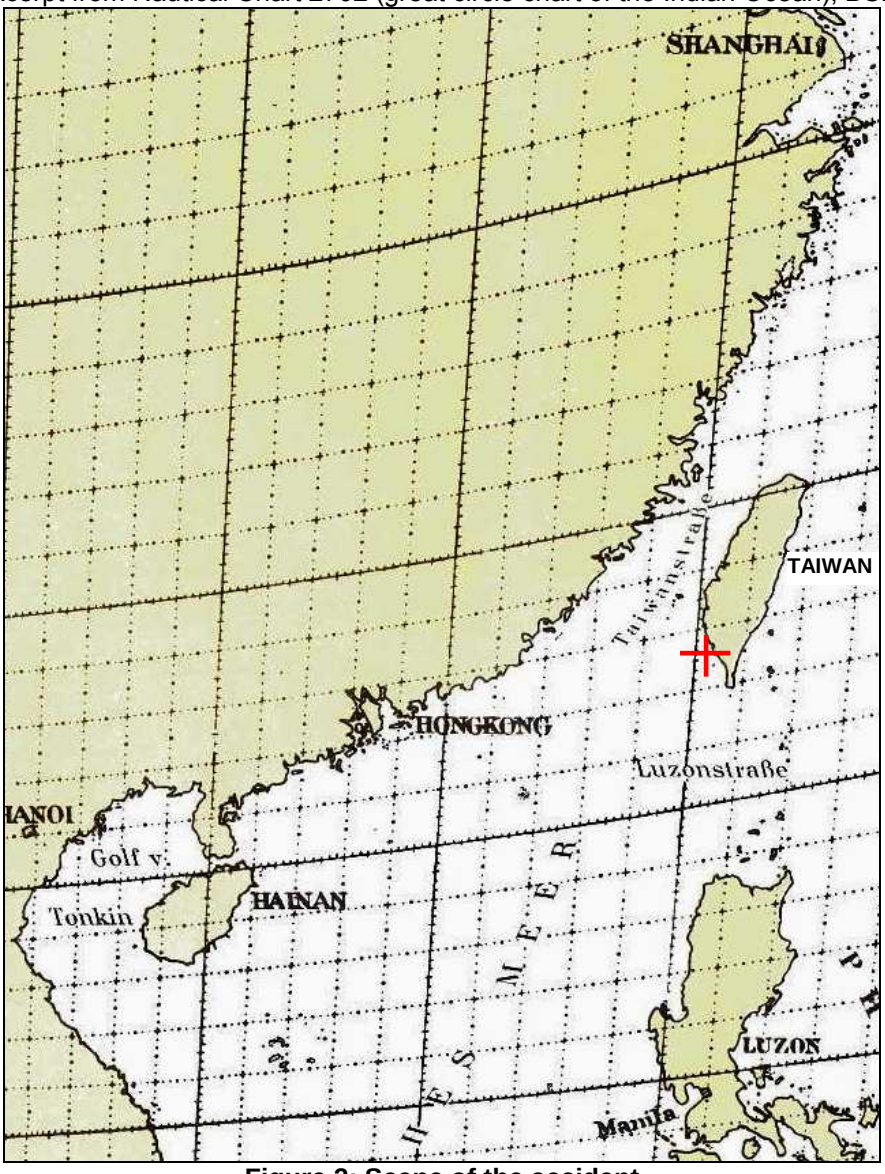

Figure 2: Scene of the accident

[4] BSH = Federal Maritime and Hydrographic Agency

2.5 Shore authority involvement and emergency response

Agencies involved:	Coastguard, Kaoshiung, Taiwan
Resources used:	Coastguard patrol boat Emergency doctor/ambulance at the port
Actions taken:	Recovery of the casualty Resuscitative measures Transport to the nearest hospital
Results achieved:	It was not possible to prevent the casualty from succumbing to his injuries – probably at the scene of the accident

3 COURSE OF THE ACCIDENT AND INVESTIGATION

3.1 Course of the accident

According to the statement of facts, log book entries and consistent testimony of several witnesses, the following sequence of events can be regarded as reliable.[5]

At about 0440 on the day of the accident (21/07/2009), the tender, manned by a skipper and one seaman, arrived at the anchor position of the YM TIANJIN to collect the relieved master and the ship mechanic. This was about 7 nautical miles off the coast of Taiwan in the roads of Kaohsiung. At about 0510, the bosun and two seamen deployed the combined accomodation/pilot ladder. Preparations were also made to lower the luggage. At 0515, the master boarded the tender. He received help while stepping from the pilot ladder onto the boarding platform from the Taiwanese seaman positioned there. In particular, this was necessary as the boat was constantly exposed to not insignificant movement because of the swell (wave height from 0.5 to 1.5 metres), which made it difficult to step from the pilot ladder onto the tender's platform. The master then collected his luggage which had been lowered on a rope, placed it in the wheelhouse and waited for the ship mechanic who was somewhat delayed and stepped onto the pilot ladder at about 0530. In spite of assistance, he was unsuccessful in stepping onto the boarding platform. The ship mechanic fell into the water between the side of each vessel but did not come into contact with them. He quickly drifted astern with the current. He submerged completely after a few swimming strokes and a cry for help. Rescue measures were immediately implemented on board the tender. Lifebuoys were cast but the ship mechanic was unable to reach them because of the swell. The tender followed the ship mechanic who was drifting towards the stern of the YM TIANJIN. He reappeared about three to four minutes after the fall in the area between the rudder blade and propeller of the container vessel and drifted lifelessly with his face under water. After an unsuccessful attempt to pull the casualty to the side of the tender with a boat hook, the Taiwanese skipper jumped into the water and put a rope around the lifeless body. The master and the tender's Taiwanese seaman then tried to pull the casualty on board. In the process, they were assisted by the skipper who attempted to provide support from the water. In spite of rigorous efforts, it was not possible for the three people to lift the body of the 140 kg ship mechanic out of the water due to the tender's high freeboard and obstacle caused by the fender, which consisted of car tyres that surrounded the hull of the vessel. Therefore, they limited their efforts to securing his body to the side of the vessel and holding his head above water.

[5] Note: In some cases there are significant differences in the specific times/periods in the statements given. In all probability, this is due to the impaired perception of time that typically follows an accident. Despite not inconsiderable discrepancies at times, this is of no obvious relevance to the assessment of the accident.

At the same time as the events mentioned above, a general alarm was issued on the container vessel and crew members were sent to her stern to assist in the rescue where possible. At about 0540, Vessel Traffic Service Kaohsiung informed the ship's command of the YM TIANJIN that a request for assistance had reportedly been received from the tender and a coastguard patrol boat was reportedly already heading for the vessel.
The coastguard patrol boat arrived at the scene of the accident at about 0620. Two crew members boarded the tender and helped to lift the ship mechanic out of the water. Both boats then sailed to Kaohsiung, where an ambulance was waiting. Resuscitative measures were performed at the scene without success.

3.2 Investigation

3.2.1 General information

The 4,298 TEU[6] full container vessel had been laid up in the roads of Kaohsiung since 22 May 2009.[7] It had a full complement of crew members on board.[8] The replacement of the master and ship mechanic was a rotational, leave-related measure.

3.2.2 Personnel transfers at sea

Apart from those involving pilots, personnel transfers at sea using a (combined) pilot ladder are an exception. A specific safety procedure designed to deal with crew members ascending/descending using a pilot ladder does not exist on board the YM TIANJIN. Neither the master nor the ship mechanic was wearing a lifejacket. The two individuals were wearing light summer clothing appropriate to the tropical climate.
According to the vessel operator, crew changes are organised by its Crewing Department, which cooperates to some degree with its Crewing Agent. Reserving a tender and booking hotel accommodation or taxi rides are the responsibility of a local agent. When crew members sign off an attempt is usually made to take them directly to the airport, i.e. to dispense with short stopovers on land.
The tender used on this occasion had already brought replacements for the master and ship mechanic to the vessel on the previous evening. Implementation of passenger transportation is carried out as a routine event. There is no major preliminary organisational work and it has no special significance. In addition to witness accounts and the apparent external circumstances, this is supported by the fact that the deck log book contains no entries, for example, about the time contact was made with the tender before she reached the container vessel or the name/call sign of the boat. Rather, the entries for the transfer under investigation began with the time at which the master descended.

[6] Container stowage capacity (**T**wenty-foot **E**quivalent **U**nit standard container according to the vessel operator)
[7] Note: The ship returned to service on 1 October 2009.
[8] So-called 'warm lay-up'

3.2.3 Condition of the deceased and cause of death

The ship mechanic was 53 years old at the time of the accident. Despite his significant obesity – he is said to have weighed about 140 kg – he was described as a very hands-on, dedicated seaman who had no obvious health problems.
There is no evidence to suggest that the ship mechanic was under the influence of alcohol at the time of the accident.

An autopsy of the body by the Taiwanese authorities was declined. According to Taiwanese law, this would have required the consent of the dependants, which was not granted. The cause of death entered on the official death certificate is simply 'death by drowning'. However, it remains unclear whether the drowning may have been preceded by a heart attack or other acute health disorder. General experience leads one to suspect this may be the case as it is highly unlikely that the ship mechanic, who was able to swim, would not be capable of staying afloat in water of some 30°C with wave heights of 1 metre within a few minutes of the fall unless he had a particular health impairment.

3.2.4 Weather conditions

The BSU requested an official report on the wind/sea conditions and visibility in the sea area off Kaohsiung from the Maritime Division of Germany's National Meteorological Service (DWD) for the period 0430 to 0530 on the day of the accident. This resulting information is as follows:

A southerly wind prevailed with a wind force of between 3-4 Bft. It is only possible to estimate the swell; however, it is improbable that this was significantly more than 1 metre and is more likely to have been between 0.5 and 1 metre. It was very cloudy; rainfall reports for the area were not provided. Visibility was 15 km. Air temperature was 28°C and water temperature was 30°C.
Sunrise was at 0526.

The weather observations recorded in the deck log book are consistent with the data in the DWD report.

4 ANALYSIS

The accident is based on a probable chain of very different factors caused by the way the shipboard operations are organised but also the general conditions ashore. However, the absence of an autopsy report and correspondingly reliable information about the cause of death render it impossible to make a determination as to which of these probable factors were actually relevant to the death of the ship mechanic, and if so to what extent.

4.1 Safety aspects relating to the transfer of crew members via a pilot ladder

The ascent/descent of crew members via a (combined) pilot ladder is not the usual method of embarking or disembarking a vessel. Rather, it is probably the case that many seamen spend years at sea without ever having to use a pilot ladder. It is possible that the physical effort associated with holding onto a ladder, which may even be moving, and overcoming differences in height of several metres may, to some degree, be significantly underestimated. Therefore, as in all other activities on board which involve a risk of falling into the water it is absolutely necessary to wear a lifejacket when using a pilot ladder.
Particular danger also arises from the fact that – as in this accident – moderate swell may be sufficient to induce vessel motions on a small tender, which make stepping from the pilot ladder onto a tender (or vice versa) very hazardous. A fall may lead to being crushed between the side of each vessel or landing on the deck of the tender with fatal consequences.
The risks referred to illustrate that embarking or disembarking a vessel using the pilot ladder is a hazardous activity and requires appropriate training or at least instruction of the crew members concerned, heightened awareness of the issue and the use of lifejackets.

4.2 General conditions surrounding the shore-based organisation of transfers

Due to the discussed dangers associated with each use of a (combined) pilot ladder as a means of embarking and disembarking a vessel by regular crew members, who are not practised in this respect, it is imperative that the local agency commissioned by the vessel operator takes every necessary measure to minimise the risks existing in this area. In addition to judicious selection of a suitable tender, this involves making logistics-based provisions in good time for the event of a transfer at sea having to be postponed due to weather conditions (hotel reservation, rebooking of flights, etc.) in consultation with the ship's command. Related cost must not be used as a basis for decisions for or against the use of a possibly unsuitable tender at an unfavourable time.

4.3 Medical fitness for service at sea

Since an autopsy was not performed on the body it was not possible to clarify whether the ship mechanic was suffering from a disease which ultimately caused his death. That the condition of the ship mechanic is very likely to have had a decisive influence on the accident, or at least its consequences, has already been discussed above (sub-para. 3.2.3).
According to art. 2 para 1 (2) Regulation on Medical Fitness for Service at Sea[9], those unable to cope with the requirements of their particular department on board or endanger other people on board as a result of one of the disorders, medical impairments or weaknesses defined in Annex 1 to the Regulation are unfit for service at sea. Annex 1 lists, inter alia, under 3 obesity which interferes with performance of duties and under 15 diseases or changes of the heart or the circulatory system which impair the efficiency or regulatory capacity and changes in blood pressure of a higher degree as being reasons for exclusion from service at sea.

Even if the refusal of medical fitness for service at sea constitutes a serious interference with the constitutionally protected fundamental right of occupational freedom (art. 12 GG [German constitution]), this premise may not lead to certification of fitness for service if there is serious doubt as to this being evident. In particular, the phrase *"requirements of their particular department on board"* in the above-quoted provision should not conceal the fact that – as has been vividly demonstrated by the case under investigation – in daily shipboard operations all crew members may be exposed to situations and pressures which demand minimum standards of medical fitness without distinction.

At national but also at international level scientists and occupational physicians have long since sought to develop a workable standard on which medical fitness for service at sea can be measured in the future according to internationally standardised criteria. Furthermore, a maritime student at the Bremen University of Applied Sciences is, with the support of the BSU, currently compiling a thesis which deals explicitly with the issue of occupational safety and obesity on board vessels.

[9] Regulation on Medical Fitness for Service at Sea of 19 August 1970 (BGBl. [Federal Law Gazette] I p. 1241), last amended by art. 4 para. 76 of the Regulation of 5 May 2004 (BGBl. I p.718).

5 CONCLUSIONS

As stated several times above, it has not been possible for the BSU to determine the ultimate cause of death of the ship mechanic. Therefore, well-founded safety recommendations cannot be issued for want of a sufficient factual basis. Instead, the BSU is limiting itself to publishing a summary investigation report on the accident.

All the same, the potential factors and prevailing circumstances surrounding the accident set out in its analysis (para. 4) should heighten the crew's, vessel operator's, and, in particular, the Maritime Medical Service's awareness of the issue in relation to accidents. As part of the Ship Safety Division (BG Verkehr), the Maritime Medical Service has a particular responsibility when arriving at a decision as to whether a seaman may serve on a German vessel without exposing himself or other crew members to danger.

It is hoped that the international efforts for standardisation and reliability with respect to the determination or refusal of medical fitness for service at sea are successful in the foreseeable future.

6 SOURCES

- Written and oral statements
  - Ship's command
  - Vessel operator
- Excerpt from the deck log book
- Testimony before the Taiwanese authorities
- Official death certificate, Hsiaokang Hospital Kaohsiung (Taiwan)
- Nautical chart and vessel particulars, Federal Maritime and Hydrographic Agency (BSH)
- Findings of the Federal Police (Maritime Investigation and Detection Group Neustadt)
- Official weather report by Germany's National Meteorological Service (DWD)